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celibacy, but urge, that, when marriage is looked forward to by the deaf, the union of two deaf persons is much surer of being attended with happiness than when one of the party is deaf and the other hearing, and that the slight and doubtful increase of a possible deaf offspring is more than outweighed by the social and personal comfort. Others draw a distinction between the intermarriages of the congenitally deaf and those who become so in mature years, urging that the probability of deaf descendants is far greater in the former case than in the latter. Many, too, regard consanguinity as a more potent factor in the production of deafness than deafness itself. Quite otherwise is the verdict given by such scientific men as Cope, Hyatt, Brewer, Newcomb, Brooks, and Bowditch. These men are unanimous in the opinion that deafness is essentially hereditary, and that the influences now in operation are similar in character to those that a breeder would furnish to bring about a variety with certain characteristics, and that these must tend towards perpetuating deafness as a constant characteristic of a certain portion of the human species. As a possible source of light in the matter, the suggestion may be offered that the heredity of deafness may vary greatly with the disease that led to it. So many cases of deafness are due to the after-effects of serious diseases, that here is a possible mode of reconciling the opposite experiences of different observers.

(4) and (5). Under these heads are given the various usages and modes of instruction in the schools of the country, with a more or less technical discussion of them.

In general, Professor Bell has succeeded in putting together much valuable matter relating to the deaf-mute class, and the presentation of this pamphlet to the royal commissioners must increase their estimation of the work of America in this field of applied science and applied philanthropy.

NOTES AND NEWS.

AMONG the publications of J. B. Lippincott Company announced as in press, we note 'An Elementary Treatise on Human Anatomy,' by Joseph Leidy; 'A Cyclopædia of Diseases of Children, and their Treatment, Medical and Surgical,' edited by J. M. Keating, M.D.; 'Life of Henry M. Stanley,' by Rev. H. W. Little; and 'Botany,' for academies and colleges, by Annie Chambers-Ketchum. — Ginn & Co. have in press 'Voices of Children,' a theoretical and practical guide on the topic, by W. H. Leib of the National Normal Music-School. — The October number of *Lippincott's Magazine* is a special E. P. Roe number, the first half of which is taken up with articles in one way or another commemorative of the dead novelist. — The Hon. Hugh McCulloch will discuss in *Scribner's Magazine* for October, free ships, revenue reform, immigration, and land-monopoly; and Prof. Arthur T. Hadley of Yale will contribute an article on 'The Railroad in its Business Relations.' — Ginn & Co. are to be the American publishers of the *Classical Review*, which is published in London, and numbers among its contributors the most eminent classical scholars of Great Britain. American scholars will be associated in the editorship.

— In a recent valuable and timely monographic paper upon the mesozoic mammals, Professor Osborn of Princeton has shown that the previously entertained views of the paucity of primitive mammalian life is not so great as has been supposed. No less than thirty-five genera are now known, including five from the trias, and one from what in all probability is correctly considered the most recent cretaceous. That all the vast gap of the cretaceous proper, so rich in vertebrate life, has not yet presented a single mammalian form, is marvellous. Scarcely less remarkable is the fact that among the known forms there is great diversity, the teeth showing six or seven wholly distinct types, "and this at a zoological period which we have been accustomed to consider as the dawn of mammalian life." Further, all these types, though primitive, are essentially mammalian, a single genus only showing any reptilian affinity. Very interesting, too, are the geographical and geological relationships of the genera. Among the thirteen or more North American Jurassic genera, six have their counterparts in English rocks, and the family relationships of all the rest are very close. One family, the *Plagiaulacidae*, has its members distributed in the

trias and Jurassic of both Europe and North America, the uppermost cretaceous of America, the lowest tertiary of France and America, and probably the post-tertiary of Australia, — truly a remarkable distribution, both geologically and geographically.

— In his 'Synopsis of the Families and Genera of the North American Diptera,' Dr. Williston has rendered a great service to the students of this neglected branch of entomology by bringing together in small compass so convenient and useful a series of tables. Some of these have been given before in different writings of the author, and he has compiled a part from the works of others; but in no place will the American student find so much comprised in so compact form. By means of it any student with tact can determine with considerable certainty to what genus any of his flies belong; excepting, indeed, in the case of some of the more difficult families which Dr. Williston has not attempted to include, such as the *Nematocera* and *Muscidae*, the latter the terror of systematists. Dr. Williston has added a bibliography supplementary to that given by Osten Sacken in his useful 'Catalogue of Diptera,' bringing the needed information regarding the literature of dipterology down to date. It should prove a stimulus to the study of the *Diptera*.

LETTERS TO THE EDITOR.

Recent Changes in the Magnetic Declination in Lower California.

REFERRING to an interesting note in *Science* for June 27, in which is given a brief account of magnetic observations lately made on the coast of Lower California and vicinity by officers of the United States steamship 'Ranger,' I beg leave to add some remarks further illustrating the change or reversal in the direction of the secular motion as noticed by the observers on the late cruise of the 'Ranger,' at Rosalia Bay. While the fact is here established by direct observations, the phenomenon had already been recognized in a discussion made in the United States Coast and Geodetic Survey Office in January last, and the results were published by permission of the superintendent of the survey, at San Francisco, Cal., in the *Mining and Scientific Press* of Feb. 18, in an article on the 'Magnetic Variation on the Pacific Coast.' Not only the fact of the reversal, but the years of the reversal of the direction of the secular motion, that is, the years when the easterly declination (or so-called 'variation') ceased to increase and commenced to decrease, are there given as follows: at San Blas, Mex., in 1856; at Cape San Lucas, Lower California, in 1873; at Magdalena Bay in 1875; and on our own coast at San Diego (Cal.) in 1883, at Santa Barbara in 1880, while at Monterey the reversal is expected about 1899. The annual decrease of the declination as given in that article is as follows: —

Year.	San Blas.	San Lucas.	Magdalena Bay.	San Diego.	Santa Barbara.	Monterey.
1885	+ 2'.9	+ 1'.2	+ 1'.0	+ 0'.1	+ 0'.4	- 0'.9
1890	+ 3'.3	+ 1'.6	+ 1'.4	+ 0'.4	+ 0'.7	- 0'.6

The fixation of these dates became possible through the discovery by Assistant G. Davidson of the records of magnetic declinations made A.D. 1714 off the coast of Mexico, and transmitted by him to the Coast and Geodetic Survey Office, where they were discussed by Assistant C. A. Schott.

While the results published in February last supersede those given in the annual report for 1886 (Appendix No. 12, pp. 290-407), no improvement can be made in the expression for the secular variation of the declination at San Francisco, for which place the calculated reversal from increasing easterly to decreasing easterly declination is predicted for 1893. At that time the declination will not sensibly differ from 16°36' east, — its then extreme value. Owing to discord among the individual observations, these predicted years are subject to an uncertainty of several years; as shown, for instance, in the case of Monterey, for which the calculation appears to assign too late a date. The accurate observations

made at Los Angeles, at the Coast and Geodetic Magnetic Observatory, by means of automatic photographic registry, point to a very recent (just before the establishment of the observatory in 1882) occurrence of the maximum east declination at that place.

In passing up the Pacific coast, we notice everywhere in Oregon and Washington Territory that either the reversal of the secular motion has already occurred, or is about to occur shortly. The present is therefore a very important epoch in the science of terrestrial magnetism as relating to our western coast, and hence demands special watchfulness on the part of the survey, in order that its charts may show our latest knowledge respecting this, to the navigator, most important information. C. A. S.

Washington, Sept. 21.

Archæological Remains in the Costa Cuca (Guatemala).

DURING my late archæological tour through Central America, I met an intelligent countryman of mine, Mr. Hermann Wundram, who spoke very enthusiastically of the mounds and idols on the coffee-plantation Santa Margarita, of which he is the *administrador*. After having visited the ruins of Iximché, Utatlan, and other places of historical interest in the Altos of Guatemala, and being anxious to see these remains, of which, to my knowledge, no explorer has made any mention, I rode from Quetzaltenango down to Retalhuleú, in whose vicinity they are situated.

Scattered over a vast area on the plantations of Santa Margarita and San Isidro, they consist of foundation-walls of stone edifices, and of a number of mounds of different heights and circumferences, either single or in pairs. One of the mounds has been used until recently as a burial-ground by the Indians. Their relative position cannot be determined, as the dense coffee-plantations can be penetrated but with the utmost difficulty.

In the neighborhood of the mounds stand upright sculptured monoliths, or lie half buried in the ground. On two of these appears in low relief the figure of a twisted serpent, surrounded by ornamental scrolls artistically executed. The ornaments have, however, no resemblance to Mexican picture-writings or to Maya hieroglyphs. One of the serpents looks at a rectangular shield in the centre of the slab, 13 inches high and 9 inches wide, and divided into four panels, the upper panel ornamented with two figures such as here given. This stone is 4 feet 6 inches



wide, 5 feet above and 1 foot 6 inches below the ground. In front of it stood a half-burned tallow candle, as an offering of the Indians, who adore these relics of their ancestors as saints, — a queer mixture of Pagan heathenism and Christian belief.

The other stone is 3 feet 8 inches wide and 4 feet 4 inches high, but the upper portion is broken off. On several of the monoliths the figures are so much obliterated, that only a few triangles and rectangles in groups can be made out; and on one of them, apparently of grayish marble (12 feet 9 inches high and 5 feet wide), but a few lines could be distinguished. A stone figure (5 feet 9 inches high and 3 feet 2 inches wide) representing the upper half of a man, and resting on a double base of oval form (4 feet wide), had but four fingers on the clumsy hands; and of the square face, only the broad-cornered nose and half of the right eye could be recognized. At the side of the figure lay a small statue, probably that of a child, with mutilated arms and broken-off head.

Near by was a cylindrical stone, of 28 inches diameter, in the form of a millstone, with a cavity of 22 inches diameter in the centre, and a half-oval annex at the lower end. A similar stone found here, but without the annex, had been placed on one of the corners of the yard in front of the planter's residence. The central cavity was of the same width as that of the former stone, but the margins were partially ornamented. I could not make out any other explanation of their use, but that these stones had served as receptacles for the hearts of the victims, after these had been torn from the breast; at least, they had a striking resemblance to the Cuauhxicalli of the ancient Mexicans.

At another side of the yard stood the sculptured bust of a man, also found in the ruins, 3 feet high, and resting on a base 11 inches high. The face was nearly round; eyes, nose, mouth, and rectangular ears, very large; the forehead low and much receding; the arms bent over the chest, with no hands; the back flat, as having leaned against some object. An obtuse-angled collar, reaching to

the middle of the chest, seems to indicate that the figure represents a chieftain.

The rude and clumsy stone figures contrast strangely with the admirably correct and artistically executed reliefs of the monoliths: hence the inference seems to be justified that both belong to different peoples and different periods, — an inference which indeed is confirmed by the tradition of the Indians. They report that a city flourished here many years ago, but that it was destroyed by the Chinantecos. The latter term is derived from *chinamitl*, a Nahuatl word which signifies 'an enclosure of reeds' (*Seto ó cerca de cañas*; *chinantia*, *hacer seto* — Molina). The *Chinantecos* are therefore the makers and inhabitants of such enclosures. But to what known tribes does the term refer? When I travelled from Lake Atitlan, the most beautiful I ever saw, to Chichicastenango, and from Santa Cruz del Quiché to Totonicapam, — districts still inhabited by the Quichés and Cakchiquels, — I discovered the interpretation of the name. The dwellings of these Indians, mere huts of reeds and wooden sticks, nestle on the declivities of the hills or in the ravines, surrounded by *milpas*, and enclosed by fences of the above material, often scattered over an area of a square league. It is the same mode of settlement, which, according to Ximenez, was even at his time peculiar to the Quiché tribes, and bespeaks their ancient social organization. A number of these *chinamitales* formed the *amac* ('clan, gens') ruled by an *ahagua*. These *ahaguas*, in turn, constituted the great council of the tribe, without whose consent nothing could be disposed of.

That in the Indian tradition above quoted the name 'Chinantecos' refers really to the Quiché tribes, is corroborated by other aboriginal testimony. Indeed, we know from the 'Popol Vuh' and from the 'Titulo de los Señores de Totonicapam,' that the Quichés had extended their conquests under Quicab, who seems to be identical with the Hunahpú of Iuarros and of the 'Isagoge Historico,' down to the Pacific coast. Furthermore, we know from the 'Titulo de los Señores de Quetzaltenango,' that the country between Mazatenango (Cakolqueh) and Mazatlan was tributary to the Quichés; nay, even in the list of tributes, fish from the rivers Samalá, Uquz (Ocos), Nil, and Xab are enumerated. The fact that the ruined city is situated between the two last-named rivers, renders it almost a certainty that its inhabitants belonged to these tributary tribes, and that, from giving their conquerors a Nahuatl name, they were of Nahuatl origin.

There is another circumstance which points in the same direction; namely, the feathered serpents on the sculptured monoliths. They doubtless bespeak a Quetzalcoatl cult, — a cult conspicuously flourishing among the Nahuatl tribes. Four immigrations of such tribes into Guatemala are recorded by the Mexican and Spanish historians. The first one is that of the Toltecs after the destruction of Tollan, the seat of their great council-house (Ixtilxochitl); the second, that of the Mexicans and Cholultecas, driven from Soconusco by the Olmecas, part of whom settled in Guatemala and San Salvador as Pipiles (Torquemada); a third one took place during a famine under the first Moctezuhzoma (Motolinia, Gomara, Herrera, Oviedo); and the last one under Ahuizotl, who, at the end of the fifteenth century, sent soldiers, under the disguise of merchants, to the Pacific coast of Guatemala, in order to form a nucleus for subduing the Quiché tribes (Iuarros).

For chronological reasons, and from the fact that the Toltecs were the most advanced of the Nahuatl tribes in the arts, I am inclined to attribute to them the origin of the ruined city and of the monolithic slabs, while I would assign to the Quichés the rude stone figures, since the latter present some resemblance to the clay idols found by Stephens in the ruins of Utatlan.

But while the sculptures on the monoliths in Santa Margarita and San Isidro show the same artistic skill and taste as those in Santa Lucia Cotzumalguapa, they are quite different from those in Quirigua, which I visited later on. The reliefs are lower, the objects represented dissimilar, and hieroglyphs totally absent.

Careful explorations in the dense forests along the Pacific coast would undoubtedly reveal more ruins and sculptures similar to those of Santa Margarita, which, along with those of Santa Lucia, would give additional proof of the Toltec occupancy of this territory.

GUST. BRUEHL, M.D.

Cincinnati, O., Sept. 12.